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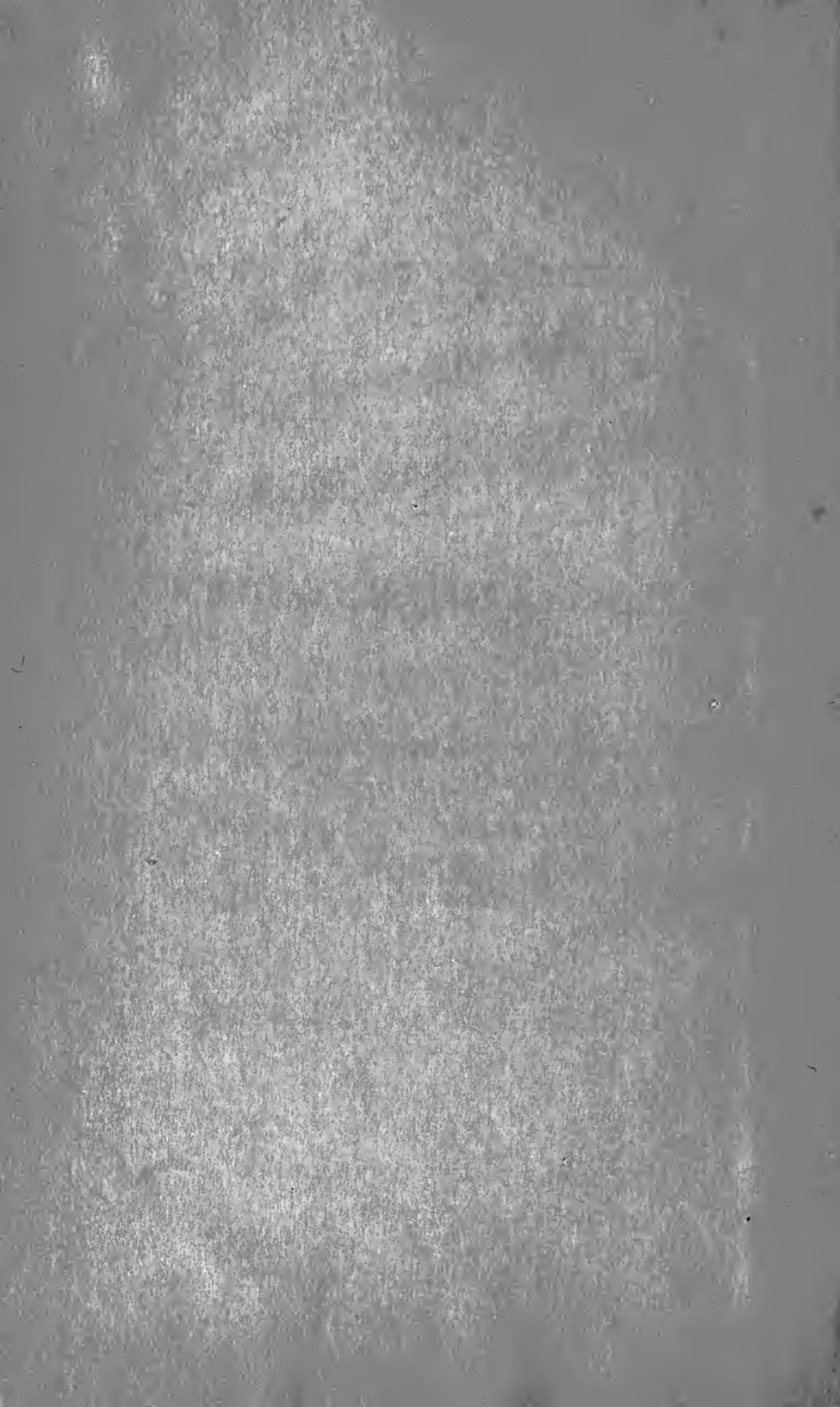
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CHOLERA,

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CHARACTER AND TREATMENT:

WITH

REMARKS ON THE IDENTITY

OF THE

INDIAN AND ENGLISH,

AND A PARTICULAR

REFERENCE TO THE DISEASE

AS NOW EXISTENT AT NEWCASTLE

AND ITS NEIGHBOURHOOD.

BY CHARLES TURNER THACKRAH.

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Lee, J. M.

REMARKS, &c.

FORMS AND SYMPTOMS.

THE disease called Cholera presents itself in different forms, of which the following are the chief:—

- I. THE MILD AUTUMNAL BILIOUS FLUX.
- II. CONGESTIVE OR PURPLE CHOLERA.
- III. CHOLERA WITH MARKED DEFECT OF SECRETIONS.

I. THE COMMON AUTUMNAL BOWEL-COMPLAINT, erroneously attributed to the eating of fruit, claims our notice rather on account of its connection with more serious disease, than its own character or effects. Oppression at the region of the stomach is succeeded by griping, by purging of faecal and afterwards of bilious matter, and by vomiting. The ejection from the stomach is at first slight, and of a watery fluid; afterwards more urgent, and the matter ejected bitter, and yellow or greenish. The strength is reduced in proportion *only* to the severity of the vomiting and the number of the evacuations. This disease subsides generally in a day or tw : it is only where the vomiting is severe, or other symptoms succeed, that a medical man is called in.

II. CONGESTIVE OR PURPLE CHOLERA.

In this form, vascular congestion is the striking feature, and produces its effects with remarkable rapidity. The man is "*struck*" with the disease. The natives of India mark Cholera by a term which signifies "death blow;" and the applicability of this term forcibly struck me on observing some of the cases at Newcastle. Ask the sufferer his first symptoms,—he seems to know or recollect none. They have either been slight, or present agony has rendered him forgetful of past and minor pain. Ask him what he suffers,—he answers in a faint or broken voice, "Oh! my stomach!" "Oh! the cramp!" Observe his countenance,—it is darkly suffused. The eyes have an expression of indifference to external objects: the pupils are contracted: the vessels of the conjunctiva injected. The tongue, ears, and nose, indeed the whole surface is cold as a stone, and more or less purple. The extremities are especially chilled: grasping the feet, we feel a continued convulsive motion of the tendons. No pulse is to be found in any of the arteries, and scarcely a beating even in the heart. The wretched man sometimes writhes with cramp and utters a cry; he is then still, and seems unconscious of surrounding objects. After a time, perhaps, a faint attempt at reaction takes place; the skin is rather warmer, and a clammy sweat breaks out; the cramps cease; but the heart and arteries soon give up the struggle. He sinks in a few hours, often without any other marked symptoms, and dies so placidly that the bystanders are not aware of his exit. In this form, as well as the congestive stage of the succeeding, we have only to take up the hand of the patient, and have at once, to the eye and the touch, a distinctive character of the disease. It is shrunk to half its size, and either a dirty purple, or blanched as if soaked in water. An

accurate account of the symptoms previous to the occurrence of congestion cannot always be obtained. When it is, vomiting and purging, not perhaps severe or of long duration, but characterized by deficiency of bile, are found to have preceded the appalling form of disease.

III. CHOLERA WITH MARKED DEFECT OF SECRETIONS.

The primary symptoms of this, like those of the first form, are vomiting and purging, and on the attack no distinction can generally be made. Soon, however, we find the evacuations from the bowels are quite different from those in the common flux ;—destitute of bile, and resembling rather gruel of oatmeal or rice. Heat at the stomach, or a burning oppressive sensation in this region, is an especial complaint. The patient's strength is remarkably reduced. Cramp attacks the lower extremities, advances to the upper, and finally affects the involuntary muscles indifferently. The countenance is haggard ; eyes sunken ; ears and nose cold and contracted ; extremities purple, cold as marble, and diminished in volume. The pulse is feeble, soon imperceptible at the wrist, and but faintly beating in the carotids. Respiration is oppressed ; the voice reduced to a whisper ; tongue cold, shrivelled, whitish, and moist rather than dry. Vomiting is generally urgent. On inquiry we find no urine voided, and often in the more advanced stage, no evacuation from the bowels. The abdomen is contracted ; thirst urgent ; the skin clammy ; jactitation frequent. The cramps now intermit or subside. In this state the vital powers gradually sink ; or, on the contrary, circulation rises a little, a pulse is found at the wrist ; hiccup marks the advance of life ; biliary evacuations are procured, the secretion of urine is restored, and the patient rises into the stage of hope.

This form, which commences like the first, with irrita-

tion in the alimentary canal, then becomes marked by vice in the organs of secretion, and assumes in its course the distinctive features of the purple disease, is the most frequent malignant Cholera which we see, and calls therefore for a particular notice of its stages.

1. *Stage of Invasion.*—This is characterized by a general but not great reduction of circulation, of nervous energy, and of temperature; the skin rather cold and moist, with a clammy feel, quite different from the perspiration of health; countenance pale and anxious; head giddy, oppressed, and annoyed with ringing in the ears; tremors; debility; dejection of mind; urine pale, and often remarkably copious;* some vomiting and purging of the natural contents of the alimentary canal.

2. *Stage of deranged Secretion and obstructed Circulation.*—Vomiting and purging frequent, of a whitish fluid, containing albuminous specks; extreme thirst; burning and oppressive sensation at the pit of the stomach; urgent cramps; secretion of urine suspended, and of other fluids reduced or depraved; surface remarkably cold and livid; pulse absent at wrists and faint even at carotids; copious cold sweat; respiration laborious; voice hoarse or abolished; mind oppressed.

3. *Stage of exhaustion.*—Extreme reduction of circulation and continued absence of secretion, but cessation of cramps, of purging, and generally of vomiting; all the functions of the nervous system progressively abolished; death.

A variety of this form is characterized by vomiting as its most urgent symptom. The patient's chief distress is from incessant retching, and craving for drink. There is a deficiency or absence of bile in the evacuation, a

* Dr. O'Shaughnessy informed me that he had sometimes found Diabetes a precursor of Cholera, and in those cases particularly where the purging and vomiting were slight.

small and thready pulse, and severe cramps ; yet no marks of congestion, no purple appearance, the tongue is warm, and voice unimpaired, and the countenance comparatively full and natural.

Another variety is marked by CEPHALIC disorder. The patient complains of throbbing head-ache, with pains about the back and chest, oppression, and sometimes heat at the pit of the stomach. The pulse is rapid, the mind confused, the cramps are urgent, and there is no bile in the alvine evacuations. But for the two last symptoms we should deny this disorder a place under Cholera. It nevertheless appears with the epidemic, is found in the hospitals, and generally begins with the symptoms which introduce the severer varieties.

The symptoms I have enumerated are those which are generally witnessed at the bed-side of the sick ; but there are others, which, from their peculiarity, or less uniformity of occurrence, require notice. The integrity of the mental faculties has been stated as a peculiar symptom. Indeed, it is sometimes very remarkable. The mind seems to sit unimpaired and serene, amidst the ruins of organic life. But the phenomenon is by no means universal, nor even, I think, general. Consciousness, as far as I have observed, is generally reduced ; there is occasionally the pettishness of a child half-wakened, stupor, sometimes difficulty of comprehension, and sometimes even coma. Vomiting and purging are moderate, or absent in the worst cases ; in few, if any, does the purging continue to the last stage. Sometimes the patient craves alike for food* and drink, but the thirst is generally proportionate to the

* A female, at Newcastle, sinking from Cholera, with whom I remained for a considerable time, often whispered, " What may I have to eat ? " " Mr. White relates the case of a native who died after 36 hours' illness. On dissection, the stomach was found distended with an immense quantity of half digested rice and meat, which was supposed to have been given clandestinely not long before death." — *Orton on Cholera.*

vomiting. The matter ejected is at first the contents of the stomach, tinged often with greenish bile ; then, as the disease is developed, the peculiar choleric exhalation, or occasionally a fluid resembling the washings of meat. The quantity is sometimes very great, and much exceeds the sum of the drink. The cramps, however violent and distressing, intermit after a time, and at length subside. Their occurrence is often indeed a favourable symptom, as indicating a return of nervous power. When venesection is attempted, sometimes only a few drops of black blood can be obtained ; but in earlier stages, the blood flows dark indeed, but with tolerable freedom.

Modified by constitution and circumstances, Cholera presents great diversities of character and combination. In the present epidemic we may readily find every variety, from the mildest diarrhoea, or bilious flux, to the purple disease. Such is the case now at Newcastle and Gateshead. The attacks at first were chiefly of the most severe kind ; but the disorder at present is comparatively mild, and of a character familiar to English practitioners. On its invading a place, epidemic Cholera is generally violent and destructive ; but in a short period it seems to sink into ordinary disease ;—to revive, however, with all its malignity, at the next town or district.

Dr. Daun informed us, and the remark has been made by others, that in India, when a patient recovered from the direct effect of Cholera, no danger was apprehended, and he regularly advanced to health, but that at Sunderland he saw a new and alarming train of symptoms frequently supervene and destroy in a few days. These were witnessed on the continent of Europe, and are fully described in the reports of *Drs. Russell and Barry*. They constitute the CONSECUTIVE FEVER. A patient rallying from the congestive stage of Cholera is found to have the skin hotter than natural, the pulse hard

and wiry, the tongue furred, drier than before, and red at the edges, and to complain of head-ache. The urine is high coloured ; there is tenderness on pressure of the abdomen ; soon the tongue becomes quite brown, and dry ; the head is more affected ; in a word, a form of typhus destroys the patient in a few days. We visited the Cholera hospital at Sunderland when the inmates were said to exhibit chiefly the consecutive fever ; but to our observation they seemed to labour generally under mild congestion, rather than typhus. The pulse was rarely above 100 ; the skin was not hot, and parched, nor the tongue dry or brown.

THE PROGNOSTIC SYMPTOMS may be stated in a few words. A return of heat, an increase of pulse, and an improvement of countenance, are decidedly favourable. A greyish, greenish, and finally natural hue of the alvine evacuations, proves recovery to have advanced. *Annesley* particularly remarks the change of blood drawn by venesection from dark to crimson as being an unequivocal symptom of improvement.

On the contrary, the continued reduction of the circulation is decidedly unfavourable. When there is no increase of temperature, when the pulse is still imperceptible, and the countenance cadaverous, we augur the worst, though the patient may eat, sleep, declare himself better, and be quite free from vomiting, purging, and spasms.*

In the fever which succeeds, and which is produced by inflammation of the mucous membrane of the alimentary canal, or inflammation of the brain, the rise of temperature, and the marks of recovery from Cholera itself,

* *Aretæus*, closes his chapter, Θεραπεία Χολέρης, with some prognostics which are worth notice :—Cessation of sweat, of purging, and vomiting ; food taken and retained, increase in the tone of the pulse, cessation of spasm ; increase of heat, and this annoying the extremities ; sleep and digestion introduce health in the second or third day. On the contrary, vomiting of all ingesta, profuse and constant sweat, coldness, lividity, extreme reduction of pulse and strength, he marks as fatal symptoms.

by no means apply as prognostics. The disorder, in fact, is quite different in its nature, symptoms, and course.

EXAMINATION AFTER DEATH.

On reviewing the early reports of Indian Cholera, we find dissection to have been generally omitted, or carelessly performed ; and the statements of one medical officer often differ essentially from those of another, and sometimes even contradict his own. But much more accordant and satisfactory evidence is found in the writings of *Orton*, *Annesley*, and the later medical officers, as well as in the reports from the continent of Europe. A summary of these statements presents the following characters :— venous congestion of the surface of the body : congestion great and extensive of the internal organs, especially of the system of the vena portæ, the lungs, and the brain : the intestines engorged, thickened, and having a doughy feel; and the small sometimes so much distended as to displace the large : the peculiar exhalation of the disease, the dirty-white thick fluid, abundant in the intestines, more rarely and less in the stomach : the mucous membrane of the alimentary canal, sometimes red in patches, sometimes dark coloured from extravasation of blood between the tunics,—more frequently pale, soft, pulpy, and easily detached from the subjacent coat: the intestines often lined with a whitish mucus, or the curdy deposit from the choleric exhalation: urinary bladder empty, contracted to the size of a hen's egg, and often lined with a mucus similar to that of the intestines: and when the patient died comatose, inflammation of the membranes of the brain, with deposit of jelly-like matter, or effusion of serum. Such have been the characters most uniform, and in which most of the observers agree. Some varieties, however, and contrasted statements must

be noticed. The bile-ducts are generally represented as pervious, and they and the gall-bladder as containing a natural secretion. But *Dr. Young* states that the gall-bladder rarely contains healthy bile; and describes its contents as a thin pale fluid in delicate subjects, and a matter like a mixture of bile and pitch, in stronger. The bile was remarked to be black by *Mr. White*; and “dark coloured viscid bile” is mentioned by *Mr. Richards*. *Dr. Keir* saw the gall-bladder frequently much distended with a “tenacious ropy bile.” The fluid in the intestines, instead of its gruel-like appearance, has been found creamy, and approaching to the character of pus. Sometimes it has been green or dark-grey, and this hue *Mr. Annesley* ascribes to the agency of the Calomel administered. The same author dwells particularly on the vermillion hue of the mucous membrane, which resembles the result of fine injection of the villi, and which he considers as characteristic of the disease. *Mr. Orton* notices the same appearance. The liver is sometimes said to have been inflamed. Sometimes there has been contraction of the stomach and intestines; sometimes inflation with air. Peritoneum devoid of its natural shining appearance.—*Londe*. A peculiar smell from abdominal cavity. Spleen sometimes bloodless.—*Christie*. A softened state of the bronchial membrane; and in the air-tube and air-cells a fluid similar to that in the intestines.—*Christie* and *Boismont*. Clotted blood in large thoracic vessels.—*Young*. False polypi in the heart.—*Taenichen*. Softening of the spinal cord.—*Marcus*. Hardness!—*Foy*. A healthy state of the upper part is mentioned by *Christie*. *Dr. Weir*, at Moscow, found congestion and partial softening of the spinal marrow, and “inflammatory congestion” in the larger nerves.

The appearances are, of course, greatly influenced by

the rapidity of the disease, the combination of Cholera with cephalic, or other disorders, and the stage in which death has occurred. *Boismont* states that in those who are promptly destroyed by Cholera, the post-mortem appearances are absent, or unappreciable, and a similar remark is found occasionally in the reports of the early Anglo-Indian writers. But the statements of those able and attentive observers, *Annesley* and *Orton*, do not support this opinion. The inflamed appearances of the stomach and intestines, often mentioned in the reports, and especially insisted on by *Mr. Annesley*, are, I suspect, liable to some fallacy. . We often find distinct patches of rose-colour, deep-red, or purple, in subjects who had no evident disorder of the alimentary canal. Something perhaps depends on the succession in which the organs die, but more, I conceive, on the partial activity of the digestive apparatus, a short time before death. The mucous coat, pale after death from lingering disease, is uniformly red during the healthy process of digestion, and in proportion to the degree of activity in the alimentary canal a short time before dissolution, will be the red, or pallid hue of its mucous coat. In many of the patients whose cases are reported, aliment was found in the stomach, and sometimes a large quantity had been eaten, even a short time before death. The unequivocal examples of inflammation and its effects have arisen, I suspect, not directly from Cholera, but from its subsequent fever. The discrepancy in reference to the state of the spinal cord demands further observation.

ETIOLOGY.

On referring to the characteristic symptoms of the disease, we find the chief disorder in the ganglionic system, the nervous system of animal life, and the blood. The secretions are suspended; no bile is formed; no urine; no tears; and probably none of the other

natural secretions : but we have in lieu of them, a large quantity of fluid, separated from the blood by a membrane which in morbid states is capable of large exhalation. The circulatory system is remarkably depressed, and the associated function of respiration consecutively, though less remarkably impaired. The calorific function is vastly reduced. The muscles of animal life suffer from tonic spasm. The blood is thick,* and altered in its chemical constituents. Let us discuss these phenomena. It is well known that secretion is dependent on the nervous system. Divide the nerve of a gland, and its function ceases. Administer arsenic to an animal, and the first effects are on the nervous system. Make a general impression on the nervous system, as by strong mental emotion—the secretions are immediately impaired. The first attack of most morbific agents, and of those especially which are considered epidemic, or contagious, is on the same system. Hence the pains in the head and spine, the cold shiverings, which mark the invasion of fever.

The poison of Cholera appears to produce its primary effects on the nervous system, and through it on the organs of secretion. If secretion be in a considerable degree suspended, the blood, of course, must retain in its composition those elements from which, in a natural

* Its *apparent* thickness has been remarked by most writers on Cholera. Experiments have been made to determine the point with precision. Professor *Hermann*, of Moscow, found “a much greater proportion of crassamentum than natural. He concludes, from his experiments, that the change of the composition of the blood is effected by a part of its ingredients being abstracted by the discharges by stool and vomiting ; and that the blood, by parting with its acetic acid, and a part of its watery particles, acquires that greater consistency and that tendency of separating its fibrine, which is observed during the disease.”

The profession, it appears, will soon be favoured by Dr. O'Shaughnessy, with an important and much more satisfactory analysis of blood and secretions of Cholera.

state, it is freed.* The elements of bile, the salts of the urine, water, and the effete parts of the body constantly absorbed, and which the glands ought regularly to eliminate, must be detained. To relieve the system suffering from the foul state of the blood, an effort is made by the intestinal capillaries, and a remarkable process commences in the mucous membrane. A large quantity of peculiar fluid is thrown into the bowels. How is this operation effected? Is it secretion? According to the derivation of the word, it is; according to the usual physiological acceptation of the term, it is not. If a similar fluid were found in the biliary ducts, it would not be called the secretion of the liver, for this organ secretes bile, a substance wholly different in appearance and chemical character. So also, the fluid found in the intestines differs essentially from the natural secretion of their mucous membrane. Is the process, then, exhalation? We know that mucous membrane, in particular circumstances, throws out a large quantity of blood without breach of surface, and sometimes a thicker substance formed from it. In the case of Cholera, we may reasonably suppose a state of the capillaries which allows the exhalation of some of the constituents of the blood. What is the fluid which is so copiously poured into the intestines, and forms the basis of the evacuations by vomiting and purging? *Dr. Christie* considers it a substance analogous to blood, in every respect save the red particles. From the experiments of *Dr. O'Shaughnessy* it appears to be chiefly water and the saline constituents of the blood. According to this view,

* It may be said that the state of the blood results not from the stoppage of secretion, but directly from the state of the nervous system, and that the stoppage of secretion is the effect of the blood's impurity. The question is not easy of solution. Morbid states are often like links in a chain, which vibrate without our being able to say which communicated the impulse from without. The explanation in the text appears the most probable.

the blood will be left of a consistence thicker than common. Such, indeed, it has always appeared on venesection. But the state of the blood requires a fuller inquiry, particularly in reference to the property of coagulation. It is represented as black and thick, quickly losing its fluidity, and forming a grumous mass rather than separating into crassamentum and serum.* “The ropy condition of the blood,” *Annesley* considers as the great diagnostic symptom of the disease. *Christie* states that he has sometimes observed blood taken by venesection “forming an uniform coagulum, after a few minutes’ exposure to the air, and this appearance it has retained 24 hours, without separating into serum and crassamentum.” Others represent the blood as never exuding its fluid. Cholera-blood, however, I have seen to separate its serum as fully as that in other diseases, and medical friends have made a like observation. Blood, taken in any malady in a small quantity, by a stream slow and interrupted, and received on a surface comparatively extensive, as two or three ounces trickling into a pint basin, adheres to the vessel like jelly, and never fully throws off its serum. Blood, moreover, when taken in a full quantity and stream, varies considerably in the rapidity with which it evolves its fluid. In cases of great debility, the exudation of serum is generally slow. Blood seen a few hours after venesection, may be an uniform mass; it may have the same appearance even at the end of 24 hours, yet shew distinct serum and crassamentum on the second or third day. I suspect, therefore, that those who state the non-coagulation of Cholera-blood have either taken

* “In malignant patechial fevers” says *Huxham*, “The crisis is so broken as to deposit a sooty powder at the bottom of the vessel, the upper part being either a livid gore, or a dark-green, and exceedingly soft jelly.”

Troillet, in hydrophobia, found the blood drawn by venesection concrete without separating its serum.

it in too small a quantity, and in a mode not calculated for legitimate inference, or have not examined the specimens at different periods after venesection. As a general statement, the following, I think, will be correct. Blood drawn during the purple form of the disease, concretes quickly, coagulates slowly, and on account of its preternatural thickness, evolves rather less serum than blood taken in other maladies.

There is another interesting part of this subject,—the fluidity of the blood in the vessels after death. This has been stated by several writers on Cholera; and in my own practice, the body of a stout fat man who was suddenly destroyed by this disease presented, 20 hours after death, the blood still fluid. The absence of coagulation has been often remarked in the necrotomy of persons who have died from other diseases. The works of *Morgagni*, *Fernelius*, *De Haen*, *Hewson*, &c. present examples. *Wepfer* found the blood dissolved and grumous in many who died from malignant, and in some who died from continued fevers. *Jackson* often remarked this state after death from fever in the West Indies. In the victims also of the plague, the absence of coagulation has been repeatedly noted. *Troillet* observed, in those cases of hydrophobia, in which the blood drawn by venesection concreted without separating its serum, that found in the veins after death was black, liquid, and did not coagulate on exposure to the air. *Valpeau* remarked, in one instance, the blood found in the vessels after death had not a point of coagulum, and its consistence “un pen plus épaisse que celle du pus bien fie.” The late *Dr. Peters*, of Kiel, informed me of an interesting example of the blue disease, in which the blood did not coagulate for three days. Called to a gentleman who fell in syncope as he walked, and died in a few minutes, I found on post-mortem examination, the blood still fluid in the vessels.

In a man who poisoned himself with opium, I remarked, on dissection, the imperfectly coagulated state of the blood. In another who was suddenly destroyed by a fall which fractured the base of the cranium, the blood was fluid in the vessels, though, on exposure to the air, the process of coagulation commenced. In two instances of death from drowning I repeated the remark of *Hunter* and others, that the blood does not concrete in its vessels. In persons killed by lightning, by mental emotions, by blows on the stomach, by certain poisons by the venom of serpents, in animals killed in the chase, the blood in its vessels does not perfectly coagulate, and seldom perhaps even separates a portion of its serum. To these general statements many more individual cases might be added. In most of those to which I have referred, in all those which conclude the enumeration, the nervous system appears to have been principally affected by the morbid agent. A shock had been given to this system, which destroyed the functions of the brain, but left vitality still lingering in the nerves. In such cases the body is generally long warm, and the muscles long retain their irritability. If we consider the fluidity of the blood to depend on the nervous energy in its vessels, and coagulation to depend on the loss of that energy, as stated from experiment in my "Inquiry into the nature and properties of the blood," we have an explanation of this curious fact. In lingering maladies, vitality is gradually and fully exhausted; in peculiar and rapid diseases, the great nervous functions alone are abolished, and enough of life remains in the blood-vessels to maintain the fluidity of their contents.

The cases and remarks illustrate, I conceive, the phenomena of Cholera. In the worst forms of this disease, as in the fatal impression from lightning, mental emotions, certain poisons, and accidents, a sudden impression is made on the nervous system, most of the

great functions are suspended or impaired, all these soon cease, and death is said to take place,—yet irritability long remains in the muscles, and life, we have reason to believe, also remains in the blood-vessels. Hence the uncoagulated state of the blood they contain. Remove this fluid out of its natural vessels, and signs of concretion are soon apparent.

The blood in its vessels has been remarked to be thick, and from the saline character of the alvine evacuations, to want a considerable proportion of its salts. Circulation consequently will be reduced, alike on mechanical and vital principles. Respiration, it is obvious, must suffer also. If the blood do not freely permeate the vessels, little in proportion will undergo the de-carbonizing and vivifying influence of the atmosphere. According to the experiments of *Dr. Davy*, not more than one-third of the usual proportion of carbonic acid is thrown off by expiration. Hence the darkness of the blood. The nervous system, from the foul state of this fluid, will not receive its usual pabulum or excitement. Here, in fact, we have an example of that re-action of effects on causes, which the animal economy in disease so frequently exhibits. The primary disorder of the nervous system produces a series of effects, which augment the disease whence they originated. Spasms and cramps are, in other disorders as well as Cholera, the result of debility, or in better terms, the want of development of the nervous energy, connected with or dependant on the want of the circulation of scarlet blood. A higher degree of the same defect leads of course to an exhaustion which precludes cramp. Hence the cessation of this symptom is often the prelude of fatal changes. To the same state of debility we refer the sweats which mark the worst cases of Cholera. Clammy and cold, they differ from the natural secretion of the skin. They are, in fact, identical with the sweats of ap-

proaching dissolution, which accompany our common maladies. They depend on a transpiration or exhalation of some of the constituents of the blood, through vessels relaxed by extreme disease. We have now come to the end of the symptoms, in the progressive sinking of the vital powers.

Convulsions have been seen after apparent death. One of the physicians employed by government mentioned to me an instance which occurred to him in India. Entering a ward in which a patient had died some hours before, he found the corpse with the feet tied down to the bed frame. On his asking the reason, the attendants stated that the deceased kicked off the clothes with his legs, and affrighted the other patients! To the physiologist this is by no means a strange relation. Death is a gradual, not a sudden change; organs, or systems of organs, die in succession. The miserable paralytic has long laboured under death of the great bulk of the nervous system of animal life, yet the brain and ganglions live; circulation and respiration are maintained; and the mind has its consciousness and vigour. The muscles of slaughtered animals long retain their irritability. I have found them contract on the application of galvanism six hours after decapitation. *John Hunter* saw evidences of vitality in the uterus of a cow, more than 24 hours after its removal from the body. In the human subject, the iris sometimes moves long after apparent death. In a female, who died suddenly in the night, it was strongly affected eight hours after, by the light of a candle. The same phenomenon I also remarked long after apparent death, in a man who was killed by a blow on the head. Thus, also, in Cholera it appears that the muscles of the limbs live, when the vitality of the nobler organs has ceased. The last convulsion and final contraction of the muscles has been known to continue long in the choleric corpse. An

example occurred at Newcastle. A body laid out for interment had the legs so bent by cramp that a coffin of double depth was required. In this case, I conceive, that vitality still existed in the muscles. The difference between it and the occurrence in India, is only in the vibratory or fixed character of the spasm.

To the rationale now offered of the symptoms of Cholera, I am aware that objections may be made. The present state of our knowledge does not admit satisfactory etiology. But a man of reflection cannot examine the disease without forming an opinion of its character, causes, and effects. "To think, is to theorize." No considerable advance can be made in our doctrines of disease,—no considerable improvement in our practice, without opinions which excite research.

PROGRESS OF THE INDIAN CHOLERA.

The geographical progress of Spasmodic Cholera from Jessore through Hindostan, from India to Europe, has been so ably detailed in other publications, that I need only make some general inferences and observations.

1. The disease arose as an epidemic, after great peculiarity in the seasons, in a filthy town, which the preceding rains had surrounded with water.
2. It spread with varying rapidity, and in an irregular manner.
3. No locality has been exempt. Towns on high ground and those on the banks of rivers—exposed and open—those in the neighbourhood of marshes—and those where the atmosphere is dry and salubrious, have been attacked.
4. As high temperature did not produce it, low has not destroyed it. The ravages of Cholera have been as marked, though by no means so extensive, in the cold of Moscow as under the burning sun of Hindostan.

5. The course of the wind has not controlled it. It has met the monsoon, and travelled as fast and as far as with the current in its favour.

6. The first residence of Cholera in a district has generally been short; but the disease has returned often with increased virulence, and destroyed those who before escaped.

7. Its fatal attacks have been first and chiefly on the poor, the debilitated, and the filthy; but no station or rank has been exempt, and the second visitation has often fallen severely on the upper classes.*

8. The total mortality of the human race by this disease exceeds that of any other pestilence.† *Moreau de Jonnes*, whose opportunities and industry have particularly qualified him for the examination, states that in 14 years it has destroyed 50 millions!

Although circumstances of climate, situation, and person have not prevented the disease, they have occasionally, and sometimes considerably modified its progress and effects. Filthy and crowded places have suffered more than the cleanly and well ventilated. Individuals, debilitated by bad food, bad habits, excess, and fatigue, by previous disease, by age, or by fear, and persons of a low grade of intelligence, have been much more frequently attacked than the healthy, the temperate, well-fed, and well-informed. Assemblies, armies, and travellers, have been particularly subject to Cholera.‡ The disease has

* *Orton* states that "in the second attack on General Pritzter's force at Guddock, the officers, who had escaped before, suffered very severely: the horse brigade, too, which had escaped at Jaulna, suffered even more than the other troops on a subsequent attack."

† Numerous illustrations of its ravages might be adduced. In Bussorah it destroyed one-third of the inhabitants in 11 days. At Port Louis, in the Mauritius, 20,000 persons, nearly one-fourth of the population, are stated to have perished in six weeks.

‡ The description of *Jameson* in the Bengal Reports has been often quoted, but it is too striking to be omitted:—

often chosen the course of rivers and navigable canals. It has often attacked the low and swampy parts in pre-

"It was here (in the grand army) that the disease put forth all its strength, and assumed its most deadly and appalling form. It is uncertain whether it made its appearance on the 6th, 7th, or 8th of the month, (Nov. 1817.) After creeping about, however, in its wonted insidious manner for several days amongst the lower classes of the camp-followers, it, as it were in an instant, gained fresh vigour, and at once burst forth with irresistible violence in every direction. Unsubjected to the laws of contact and proximity of situation, which had been observed to mark and retard the course of other pestilences, it surpassed the plague in the width of its range, and outstripped the most fatal diseases hitherto known in the destructive rapidity of its progress. Previously to the 14th, it had overspread every part of the camp, sparing neither sex nor age in the undistinguishing virulence of its attacks. The old and the young; the European and the native; fighting-men and camp-followers, were alike subject to its visits, and all equally sunk in a few hours under its most powerful grasp. From the 14th to the 20th or 22nd, the mortality had become so great and general, as to depress the stoutest spirits. The sick were already so numerous, and still pouring in so quickly from every quarter, that the medical men, although night and day at their posts, were no longer able to administer to their necessities. The whole camp then put on the appearance of an hospital. The noise and bustle almost inseparable from the intercourse of large bodies of people, had nearly subsided. Nothing was to be seen but individuals anxiously hurrying from one division of the camp to another, to inquire after the fate of their dead or dying companions, and melancholy groups of natives bearing the biers of their departed relatives to the river. At length even this consolation was denied to them, for the mortality latterly became so great, that there was neither time nor hands to carry off the bodies, which were then thrown into the neighbouring ravines, or hastily committed to the earth on the spots on which they had expired, and even round the walls of the officers' tents. All business had given way to solicitude for the sufferers: not a smile could be discerned, nor a sound heard, except the groans of the dying, or the wailings over the dead. Throughout the night especially, a gloomy silence, interrupted only by the well-known dreadful sounds of poor wretches labouring under the distinguishing symptom of the disease, universally prevailed. Many of the sick died before reaching the hospitals, and even their comrades, while bearing them from the outposts to medical aid, sunk themselves, suddenly seized by the disorder. Never was the impressive language of Scripture more applicable than now: 'In the midst of life we are in death.' All security of life was gone; and as youth and vigour afforded no safety, even the healthiest man could not in the morning tell that he might not be a corpse before night.

"The natives, thinking that their only safety lay in flight, had now begun to desert in great numbers, and the highways and fields, for many miles

ference to the more elevated.† Its prevalence and virulence appear also to be affected by the state of the atmosphere.‡

9. The Cholera has been often connected with other epidemics, as fever and dysentery.

round, were strewed with the bodies of those who had left the camp with the disease upon them, and speedily sunk under its exhausting effects. It was clear that such a frightful state of things could not last long, and that, unless some immediate check were given to the disorder, it must soon depopulate the camp. It was therefore wisely determined by the commander-in-chief, to move in search of a healthier soil and of purer air. The division accordingly marched in a south-easterly direction, towards Talgong and Sileia, and, after several intermediate halts, on the 19th crossed the clear stream of the Betwah, and, upon its high and dry banks at Erich, soon got rid of the pestilence. But its line of march, during the whole of this movement, exhibited a most deplorable spectacle; although every means had been taken, by giving up the ammunition carts, and collecting elephants and draught cattle, to procure sufficient carriage, the sick were found too numerous to be moved, and were, in part, necessarily left behind; and as many who left the carts, pressed by the sudden calls of the disease, were unable to rise again, and hundreds dropped down during every subsequent day's advance, and covered the roads with the dead and dying, the ground of encampment, and line of march, presented the appearance of a field of battle, and of the track of an army retreating under every circumstance of discomfiture and distress.

It is stated in the Medical Reports, that "several persons in the bazaar and fields have suddenly become giddy, fallen down, and after one or two slight efforts to vomit have expired in a few minutes." "At a ball given on board the ship *Liverpool*, in the Hoogley, fifty persons were present; one-half were seized with Cholera, and ten died within a week afterwards." *Orton.*

† *Mr. Chapman* states that "the grass-cutters of his party were found to suffer severely from Cholera, whilst the rest of the party suffered little. Out of eighteen of these people, five died in three weeks, and as many more were attacked. They were resorting daily to a putrid standing pool, for the purpose of washing their grass. They had themselves connected the attacks with this pool, and of their own accord deserted it, after which no further cases occurred, during a stay of nine weeks at the place."

‡ *Mr. Orton*, who has paid great attention to this subject, draws the following inference from his elaborate survey:—"The atmosphere, during the prevalence of the epidemic, is in a rarified state, and exhibits a great tendency to part with its moisture, forming thick clouds, heavy rain, or haziness, and to become agitated by storms."

10. Diseases resembling Cholera have been observed among brutes. §

§ *Mr. Jameson* says,—“It was observed in many places, that an unusual mortality occurred amongst black cattle, sheep, dogs, and other domestic animals. Thus, in the Backergunge district, cattle had the disorder, and were cured by opium and the other remedies found most serviceable in the human species; cows, when seized, shed their young. So in Tipperah, great numbers of horned cattle and sheep were seized with vomiting (!) and convulsions, and suddenly expired. In 1815 again, half the cattle of the lower part of Tipperah were carried off by a disease similar to Cholera. In Delhi, dogs died rapidly, and more horses than usual were carried off by the dry gripes. In the Rajpootana force, and throughout the whole of the Jeypore and Nagpore territories, the season was remarkably fatal to camels; and in the centre division domestic animals of all descriptions died in great numbers; but in the latter instance the mortality might be ascribed to want of proper food. At Sumbhulpore, an elephant had every symptom of Cholera, and was cured by brandy and laudanum.”

Mr. Searle also states, that, “during the prevalence of the Cholera at Manantoddy, he had observed an extraordinary mortality among the poultry; and he quotes *Dr. Ranken’s* statement of many camels, goats, and other animals, having died of violent diaarhoeas and other ailments in Rajpootana.”

Dr. Joenichen asserts that, “both at Taganrog and Moscow, it is universally admitted, that several species of animals have died with symptoms characteristic of Cholera, as geese, turkeys, fowls, and crows. At Berlin, the domestic animals, and even the fish, are stated to have suffered simultaneously.

A curious circumstance observed was an extraordinary visitation of flies, previous to the epidemic. *Mr. Jameson* states, that in Delhi, it was remarked that “large swarms of flies, which had infested the place before the breaking out of the epidemic, wholly disappeared during its prevalence; and returned as it withdrew.”

The Englishman’s Mag. reports that “during the summer of 1830, the Tartars who frequent Moscow for purposes of traffic predicted the approach of a pestiferous malady, which, however, the inhabitants, relying upon the local advantages of their city, would not credit. Suddenly, however, the atmosphere was filled with dense masses of small green flies, which in Asia are the forerunners of pestilence, and are called plague flies. The streets swarmed with these insects, and as soon as the inhabitants quitted their houses, they were covered from head to foot. For a time, however, no attention was paid to this phenomenon, nor were any preventive measures against the Cholera even thought of, until intelligence arrived that this formidable disease had appeared at Nischid-Nowgorod. *Dr. Neale* has founded on such observations a theory, which ascribes epidemic Cholera to an atmosphere poisoned by flies !

Of the primordial germ of Cholera we know nothing, and of the mode of its propagation, little. Much has been written on the spread of the disease. The medical press teems with disputes on the contagious, or non-contagious—on the infectious, or non-infectious—on the communicable, or incommunicable character of the malady. But have the disputants accurately examined the atmosphere by which, or through which, the disease is propagated?* The chemists find little difference between the pure air of the mountains, and that of confined apartments fouled by the respiration of a crowd; and on marsh miasms or malaria, little light has yet been thrown. Till this subject be developed, nothing fully satisfactory can be established, on the subject of infection, the character of endemics, or the spread of epidemics. We may infer, however, from the information hitherto adduced, that peculiar states of the atmosphere, connected with its electricity, or with terrestrial exhalations, produce a disease, which, in proportion to the number of patients, and the unfavourable circumstances in which these patients are placed, becomes aggravated in character, assumes an infectious nature, and is communicated from person to person. This communication, however, is not uniform. Some states of atmosphere promote it, some resist it. Neither does the disease attack persons indifferently. A great proportion of every population is invulnerable; Cholera

* *Mr. Hermann*, of Moscow, found “the air immediately surrounding the patient to contain a substance which, when deposited upon cooled surfaces, resembled animal mucus. It did not re-act upon test papers, and was precipitated by sugar of lead, and tincture of galls, bearing great analogy to the substance which *Moscati* separated from infected air. Mr. H. is of opinion, that at a certain state of the Cholera a miasm is developed, and that under certain predispositions of the constitution, the breathing of air containing the infectious matter, communicates the disease.” *Johnson's Med. Chir. Rev.* July, 1831. This curious observation requires confirmation.

strikes down the predisposed ; and when these have been attacked, the disease disappears, for a time at least, in the town or district.

We found that almost all the medical visitors at Sunderland in frequent communication with the sick, had been more or less indisposed. Their chief complaints were, loss of appetite and nausea; diarrhoea and colic; and cramps in the fingers and arms. A Sunderland surgeon, we were informed, on inspecting a Choleric corpse, received a slight scratch or prick, and was afterwards seized with the characteristic symptoms of the disease. Happily, however, he recovered. The mother of the medical gentleman who, from his situation as town's surgeon, had a great majority of the Cholera patients in his care, took the disease, and died in a short time. The master of the workhouse, where Cholera was particularly frequent and fatal, had been very attentive to the wretched inmates: he was affected in the night with diarrhoea, but was nevertheless walking on the moor at eleven in the morning, when he was seized with alarming symptoms, and was dead in a few hours.

AN ENGLISH EPIDEMIC.

Having briefly adverted to the Eastern, I turn to an English Epidemic, which produced severe effects, and considerable alarm, in the autumn of 1825. I speak of the disease as it occurred in the neighbourhood of Leeds.

A notice of the state of the weather seems necessary to introduce the subject of an epidemic. In May, 1825, 3-8ths more rain fell than the usual quantity; and the wind was east nearly the whole month. In June, the weather was showery, and, on some days, particularly

sultry; on the 12th the thermometer reached 87 degrees; the wind was variable, but principally west. In July the weather was sultry, barometer high, winds variable, and the quantity of rain particularly small, not exceeding 1-5th of the usual quantity. About the 3rd of August, the drought which had prevailed for several weeks was relieved by refreshing showers: during this month the quantity of rain exceeded the average, the weather was sultry, the barometer low, and the wind generally west.

A few cases of Cholera occurred in May, June, and July. The disease, however, could not be considered rife till August. In this month it prevailed extensively in the town of Leeds, and less in the surrounding country; but in September the prevalence was reversed. The epidemic could scarcely be said to have subsided till the month of December.

The chief symptoms were purging and vomiting, cramp, coldness of the extremities, and prostration of strength. Sometimes the disorder was mild and gradual in its invasion, the reduction of strength neither great nor sudden; there were frequent evacuations from the bowels, but more sickness than vomiting; and little cramp or coldness of the extremities.

But in many cases the disease

was more severe. A debilitated female, for instance, was affected with lax, and was found on the visit of her medical man, some hours after, greatly reduced, and with a pulse scarcely perceptible. The evacuations from the bowels were generally but little, and sometimes not at all tinged with bile: there were great depression and uneasiness at the stomach, with a constant disposition to vomit. In addition to the aliments rejected, there was often a fluid, which occasionally contained particles of a greenish matter, but after a time resembled gruel, or barley water. Cramps were a general attendant, but were not very violent. The extremities were cold and contracted, the countenance shrunk,

and the voice enfeebled. If medical treatment failed to restore the circulation and allay the vomiting, she sunk in a few days.

In a few cases, the attack was more sudden and urgent. The harvest-man was seized in the field with a great sense of debility, the bowels were relaxed, vomiting succeeded, the countenance sunk, the extremities became cold, cramps seized the limbs, extended with violence to the trunk, the pulse declined, and he was a corpse the second or third day.

Inflammation of the mucous coat of the stomach frequently succeeded on the milder attacks of Cholera. The symptoms of this disease were found subsiding one day, and on the next superseded by a new train ;—hot pain, or a sensation of great heat in the region of the stomach, aggravated by food and warm drinks, relieved by cold diluents, or by cold applications to the epigastrium. The progress of the disorder exhibited delirium, or disposition to delirium, and its close was marked by a vitiated state of the bile, and by mild diarrhoea. From our notes, taken at the time, it appears that no cases of this disorder terminated fatally.

Colic occurred in Leeds so frequently during the month of August, as to give the idea of a short-lived epidemic. Fevers, simple and typhoid, did not frequently succeed on Cholera in my own observation, but I was informed of their occurrence by other practitioners.

The epidemic Cholera we observed to attack one district more than another, and to be much more severe in some than in other classes of the population. Anxious to reduce this observation to greater accuracy, and to develop the circumstances which promoted or counteracted the spread of the disease, I took, with the assistance of intelligent pupils, a medical census of a limited portion of Leeds, and of certain villages or districts, contrasted in situation or salubrity. Inquiries were made at the houses as they occurred. In the thinly populated districts we included, as nearly as

practicable, the area of a square mile ; and in all cases, care was taken to make the respective examinations as similar and fair as possible.

The district of *Moor Allerton*, or Moor-Town, including King-Lane, and Bake-houses, is three to four miles north of Leeds, elevated, almost destitute of wood, and with no stream in the neighbourhood larger than a rivulet. The soil is heathy and barren, and the population thin and scattered. The peasantry are chiefly employed as farmers' labourers, or in procuring and carting sand to Leeds. They are, I think, in a state of greater poverty, than the inhabitants of any other place near this opulent town. In 60 houses, and 299 inhabitants, 114 persons had been sick in the months of July, August, and September. There had been 81 cases of Cholera, many of them severe, and 3 fatal. Children as well as adults had been attacked. In one family of 6 individuals, all had been attacked with Cholera : in another of 4, all, and the wife died : in one of 6, all had been attacked : in another of 6, 5 suffered : in one of 7, 6, and 2 of these had afterwards Dysentery. This disease, indeed, frequently occurred, both as a consequent on Cholera, and as a primary malady. Inflammation of the villous coat of the stomach and intestines, had in many cases succeeded to Cholera. A few instances also of a fever had occurred, rare in its kind, but mentioned by Sydenham, under the title of " a New Fever." Its chief peculiarity was the slow, or regular state of the circulation ; the pulse never rose. Several instances also of inflammation of the brain, and of typhoid fever had occurred. *Halton*, 3 or 4 miles east of Leeds, is situate on an eminence, adjoining the woods of Temple Newsam, has its soil rich, and its population rather crowded than scattered. The people are chiefly employed in agriculture, and are in better circumstances than the sand-carters of Moor-town. In 60 houses, and 298 inhabitants, 74 had been sick in the period

referred to, and 63 of these have been attacked with the Cholera. The cases appear to have been generally slight; and only one inhabitant of Halton, an aged female, died under the disease. *Kirkstall*, 3 miles north west of Leeds, is situate in a fertile valley, on the banks of the river Aire, and surrounded by woods. The inhabitants are chiefly employed in the cloth manufacture. In 30 houses, and 172 inhabitants, 49 had been ill, and of these 47 had been affected with Cholera. The disease had not generally been severe.

In *Leeds*, 60 houses of various classes, but taken indifferently, were found to contain 297 inhabitants, of whom 129 had been sick: 59 persons had been affected with Cholera, one died, but few had suffered severely. In a family of five, all had been affected with Cholera; in another of four, three had been affected, and of these one was sinking under the disease; in another of four, all; in a family of ten, every individual had been seized with Cholera, or diarrhoea. Indeed, in the other districts as well as in *Leeds* and *Moortown*, the same prevalence of the disease in families was remarked. There was one fatal case of inflammation of the brain in the houses examined in *Leeds*.

In my own practice, there were 89 cases of the disease in August and September—about 79 in the town, and 10 in the country, many of them severe, but only one fatal, and in this the subject was moribund when my assistant was called to him. He was an old man, attacked with vomiting and purging, which, though not extreme, were quickly succeeded by fatal exhaustion. The few deaths which occurred in the town, and in the practice of others, were chiefly, I was informed, among the poor and debilitated. Perhaps my reports in reference to sickness in general, and to Cholera in particular, will be most clear in a tabular form:

	SICK.	INHAB.	
At Moor-Allerton	114	299	or 1 Person in every 2.62—33 per Cent.
Kirkstall	49	172	or 1 do. 3.65—28 do.
Halton	74	298	or 1 do. 4.02—24 do.
Leeds	129	297	or 1 do. 2.31—43 do.

Thus Leeds and Moor-Allerton appeared to be decidedly more unhealthy than Halton and Kirkstall.

	CHOLERA.	INHAB.	
At Moor-Allerton	81	299	or 1 Person in every 3.69—27 per Cent.
Kirkstall	47	172	or 1 do. 3.65—27 do.
Halton	63	298	or 1 do. 4.73—21 do.
Leeds	59	297	or 1 do. 5.03—19 do.

The fatal cases at Moor Allerton were 37 per cent. of those affected with epidemic. Kirkstall and Moor-Allerton, it appears, had more Cholera than Leeds or Halton.

From other observations in practice, as well as the preceding statements, I drew at the time the following remarks:—

1st. Cholera was much more prevalent in the country than in the town. The atmosphere, the great agent, of course, in all epidemics, pure in the country, and fully subject to all the changes of season, is much more artificial in large and populous towns. Smoke, animal effluvia, and probably also diversities in the electrical state of the air, greatly diminish its susceptibility to those changes morbid as well as healthy, which nature effects in successive years. Thus, while the impurity of atmosphere generally prevents townsmen enjoying robust and buoyant health, it also shields them from the violence of epidemics. Typhus frequently affords an illustration. Prevalent and fatal in the fine and elevated village of Rawden, marked neither by poverty nor filth, it is rarely severe in the sheltered town of Leeds, which of course abounds with the usual fomites of disease.

2nd. Lofty situations, and those especially which are almost destitute of wood, were more subject to Cholera, than plains and vallies.

3rd. Cholera seized chiefly the poor and debilitated. In several pauper families at Moor-Allerton, we found that every individual had suffered, more or less, from the epidemic, and that the three who died in the district examined were debilitated females, destitute of the comforts, and almost of the necessities of life : while the fatal case we attended, not far distant, was a man oppressed with a large family, ill-fed, and hard-worked. The comparative exemption of the upper classes of society, I have often observed in my own practice in the town ; and in the country this fact is more remarkably exemplified. At Moor-Allerton, in the district examined, there are six residences of merchants and gentlemen, containing 50 individuals, and of those only one had Cholera,—2 per cent. As a contrast we found in six of the poor houses, containing 39 inhabitants, 21 had been affected with the disease—53 per cent. A similar observation was made at Kirkstall. The power, in fact, of most agents of disease is diminished in the inverse proportion to the animal vigour of the individuals exposed.

These observations, written in 1825, seem to refer Cholera to atmospheric influence, independent of infection or contagion. But a note, made at the same time, shews that there was also another mode of propagation suspected. “ Several observations lead me to suppose that Cholera is sometimes infectious. I do not assert the fact, but I have observed as many circumstances concur to favour this opinion in reference to Cholera, as in Fever—at least in the cases I have seen in this neighbourhood for the last nine years.” A recent examination of the details of the epidemic produces the conviction that although it originated in a wide-spread constitution of atmosphere, it was capable, in certain circumstances, of being communicated from person to person.

Dysentery, before almost unknown as an epidemic to the present practitioners of this district, during the autumn pre-

vailed to a great extent. Sometimes it was preceded by Cholera, the milder symptoms of this disease being merged in those of dysentery. Sometimes it occurred without other precursors than those of general oppression, and reduced health. Pain in the lower part of the abdomen, with tenderness on pressing the region of the colon ; frequent evacuations, at first feculent, afterwards mucus and blood, sometimes pure mucus, very rarely of scybalæ ; tenesmus ; often rigors,—were the general symptoms. In my practice no patient died ; nor were there, I believe, many deaths in Leeds or its *immediate* neighbourhood. In October, however, the report of an extraordinary mortality at Gawthorpe, near Wakefield, induced me to examine the state of that village.

Gawthorpe, 4 miles west of Wakefield, on high ground, and almost destitute of wood, is inhabited chiefly by weavers, who, though not generally poor, are dirty in their persons, and have their houses more than commonly filthy, and ill-ventilated. Few, if any persons above the lowest class live in the village. As there is no public well, the water drunk is obtained chiefly from ponds. We found that in the preceding three months, particularly the two last, there had been more sickness than at any preceding period in the memory of the inhabitants ; that 20 persons, of all ages, had died from the epidemic ; and that there were one morning seven corpses in this small village ; that all the sick had medical assistance ; and that the disease was then as rife as ever. Of 70 houses which we examined seriatim, only 17 had been exempt from Cholera and Dysentery ! In a family of 4, 3 had been attacked with Cholera, and 1 of these afterwards with dysentery ; in one of 9, 7 had been ill, 2 in Cholera, 2 in dysentery, and 6 in typhus ; in one of 11, 6 had been affected with dysentery ; in one of 5, all with Cholera ; in one of 7, 6 with Cholera ; in another of 7, 5 with dysentery ; in one of 9, 5 with Cholera, and 2 with

dysentery ; in one of 4, all with Cholera. The disease presented few cases in the neighbouring villages. In one, *Hanging Heaton*, about two miles distant, 60 houses were examined, and of the 371 inhabitants which they contained, two only had been affected with Cholera, and none with dysentery. In *Batley* also, about three miles distant from *Gawthorpe*, the epidemic was by no means rife, yet here, as in other places, a few families suffered severely. Thus, at one of the houses examined, we found, that of a family of 9, 8 had been attacked with Cholera and dysentery. The disease at *Gawthorpe* was believed to be infectious. One man, convinced of this, prevented intercourse with his neighbours, and his family, consisting of eight persons, had not one individual attacked. The medical practitioner, who had most of the sick of *Gawthorpe* in his care, though he did not live in the village, lost two of his own children by the disease. The cases I saw, at my examination of *Gawthorpe*, were too few to afford materials for description ; but *Mr. Dobson*, now of Pimlico, London, attended personally and regularly a large proportion of the sick ; and from the statements with which he last week favoured me, I draw a brief account of the prominent symptoms. These were—frequent alvine evacuations of a watery fluid, generally bloody, containing sometimes shreds of lymph, sometimes scybalæ ; “the amount of discharges from the bowels almost incredible ;” excessive tormina before each evacuation ; continual and urgent calls to stool ; tenesmus ; pain along the course of the colon, particularly about its sigmoid-flexure ; vomiting an occasional, rather than a regular attendant. Sudden and great prostration of strength marked the commencement of the disease, and fever of a typhoid character its course. A pulse rapid, and small ; tongue brown and dry ; and extreme exhaustion preceded the fatal event. This was generally on the 4th or 5th day.

The points of connection and resemblance between Cholera and dysentery, is a subject which requires investigation. Dysentery is often preceded by Cholera, both in its epidemic character, and attack on the individual patient. Like Cholera, it attacks chiefly the debilitated; it is marked by the absence of biliary secretion,—often, too, of the urinary. The difference in the post-mortem examinations, does not prove a difference in the origin and essential character, for ulceration and sloughing of the large intestines, are not necessarily a cause: they may be, and probably are, more frequently an effect.

IDENTITY OF ENGLISH AND INDIAN CHOLERA.

The descriptions in the last chapter may have prepared for the introduction of the present, and diminish the surprise which its title would have produced. The bulk of the profession, and the principal writers on the disease, have supposed a wide difference between the epidemic Cholera of India and our own. My observations on this subject I introduce by Sydenham's description of the English epidemic of 1669. “Vomitus enormes, ac pravorum “humorum cum maxima difficultate et angustia per alvum “dejectio, cardialgia, sitis. Pulsus celer ac frequens, cum “æstu et anxietate, non raro etiam parvus et inæqualis, “insuper et nausea molestissima, sudor interdum diaphoreticus, crurum et brachiorum contractura, animi deliquium, “partium extremarum frigiditas, cum aliis notæ symptomatis, quæ adstantes magnopere perterrefaciunt, atque “etiam angusto viginti quatuor horarum spatio ægrum interimunt.” I am aware that the characteristic symptoms are not fully developed, but enough is said to mark the disease. The secretion from the bowels is not minutely described, but it certainly was a *morbid* secretion:—it was not

bile. So close an observer would not have confounded a common bilious flux with an opposite state of the alvine dejections. The heartburn, or burning sensation at the pit of the stomach, which *Annesley* urges as a great diagnostic of the Indian disease, is also marked by *Sydenham*. So also we have cramps, coldness, of the extremities, wasting sweats, deliquium, and speedy death. If the disease was not the spasmodic Cholera, what was it ?

I will now allude to notes or extracts from notes of cases which have occurred in different years under my own observation, or that of medical gentlemen in the neighbourhood. Several of them are imperfect in detail ; but all, I conceive, have a strong bearing on the present subject.

1. In July, 1822, a stout and healthy man was affected with lax for about a week. It was not such, however, as to prevent him pursuing his usual active occupation. After chapel on Sunday, he ate a dinner of rice, and drank a mug of beer ; but half an hour afterwards, about one o'clock, he was seized with copious vomiting and aggravated purging. The dejections were light-coloured and muddy. In an hour, his face was contracted, cold, and livid ; and nose, to use his wife's phrase, "nipped like death ;" and the circle of his mouth was purple. Thinking her husband was dying, she sent an urgent summons for medical assistance. Visited between 3 and 4 p. m. ; he was in a state of great exhaustion, suffering from severe cramp ; his countenance sunk, haggard, and purple ; pupils contracted ; surface of the body universally cold, and covered with clammy sweat ; pulse not to be found at the wrists, and in the carotid beating weakly at 155 ; voice lost ; evacuations from the bowels wholly destitute of bile. *Mr. Corsellis*, then my pupil, remained with the man till the next day, assiduously applying the remedies prescribed. For seven hours there was no improvement, no increase of temperature, no pulse at the wrist, and voice audible only when the inquirer's ear was close to

the patient's mouth. After this time, however, there was a slight reaction, and this progressively advanced. Stools were procured of the colour of ginger-bread. It was particularly remarked, that for three days from the attack, no urine was voided. The man is alive and healthy at the present time.

2. In August, 1824, a strong man was attacked with vomiting and purging. The evacuations were quite devoid of bile. The cramps exceeded in violence any thing I had before seen. Such were their convulsive character, that he was once thrown out of bed, and three men were afterwards required to hold him. The agony made him cry out with vehemence. This patient also recovered.

3. In September, 1825, a debilitated and ailing female, attended by *Mr. Corsellis*, was seized at three, a. m., with vomiting and purging. Most distressing cramps speedily ensued; the surface became cold; the countenance sunk; and, to use the phrase of a woman who attended her, was "all blue as violet." The stools were colourless. She could not retain them. She died about eight in the evening, 17 hours from the commencement of the urgent symptoms. On laying out the body, the women particularly remarked its blue, black, mottled appearance. One leg remained flexed by spasm, its foot resting on the shin of the other.

4. An elderly woman, who attended the funeral of the preceding, was attacked a week after. After shearing corn all day, she went to bed well at night, but at eight, a. m. was seized with vomiting and purging, frequent and profuse. The countenance was much shrunk; the eyes sunk, and surrounded with a blue circle; the whole surface cold, and extremities quite pale. The evacuations were not seen by her medical attendant, but they were said to be yellow and offensive. She had no cramps; she lay indifferent to external objects, and constantly dosing. Some reaction took place next day; but on the third morning, she became worse, continually complained of cold, and sunk at night.

These two females lived in a hamlet, the houses of which are as close to each other as those of a town. After these deaths, Cholera spread among the inhabitants, and left not a house unattacked.

5. My excellent friend and quondam-pupil, *Dr. Whytehead*, of Beverley, has referred me to a case which occurred while he was with me, in the year 1825, and of which I regret that I cannot find any details recorded. A man was attacked with violent symptoms of Cholera, at two o'clock in the morning, and sunk at ten,—eight hours, consequently, from the invasion of the disease. On post-mortem examination, our principal remark was the large quantity of albuminous matter in the small intestines. The stomach was greatly contracted.

6. In September, 1825, a labouring man, 63 years of age, was affected with diarrhoea for a few days, but so mild as not to interfere with his usual avocations. In the night, he was seized with vomiting, and when seen three hours after the attack, by *Mr. Scholefield*, then my assistant, he had the facies hippocratica, extremities cold, and radial artery without pulsation. He died in two or three hours.

7. In 1829, a young gentleman, after a few days' bowel complaint, which was not severe enough to keep him from school, was suddenly seized early in the morning with great debility, vomiting, and fainting. When I reached the house, his face was contracted, purple, without warmth, and expressive of distress. The whole surface was cold. At the wrist no pulse could be found; in the carotids it was feeble. There was then neither vomiting nor purging, but the cramps were particularly severe, and he complained of great oppression at the stomach. After about two hours active treatment, the circulation rallied, and in the afternoon the urgent symptoms had subsided. He remained, however, for several days in a state of great debility, and it was longer, before a healthy state of secretions could be restored.

8. Last September, a man of temperate habits was awaked at two o'clock in the morning by sickness, and to this succeeded vomiting and purging of a pale fluid—cramp in the legs, and dizziness. The prostration of strength was sudden, and so great that he could not raise himself from the bed, even for the evacuation of the bowels. My assistant saw him three hours after the attack, and found the countenance sunk, the extremities cold, pulse scarcely perceptible at the wrist, and faintly beating 112 at the carotids. The patient vomited a yellowish matter, and afterwards a fluid resembling the washings of meat. He was insensible to the presence of his attendants. I visited him about seven o'clock. At this period there were the same characters of countenance, and of circulation ; nose and ears contracted ; eyes sunk ; tongue cold as a stone ; voice a whisper ; vomiting very frequent, but no evacuation from the bowels ; continual jactitation. After the assiduous use of remedies the patient at 9 A.M. was considerably relieved ; countenance improved ; consciousness restored ; pulse stronger, and extremities warm ; perspiration free ; but thirst was urgent, and vomiting frequent and copious. This continued in such a degree, that at twelve o'clock, though he had not drunk more than four pints, he was supposed by his relatives to have ejected, between five and that hour, about two gallons. The vomiting was at length allayed, and no urgent symptoms remained. The man rapidly recovered.

9. Last August, a patient in the Lunatic Asylum, at Wakefield, was found by the keeper at 6 A.M. affected with urgent vomiting and purging. At eight, the countenance was discoloured and sunk ; the circle of the mouth blue ; the feet cold, the whole body covered with a chill clammy sweat : the pulse almost imperceptible ; the stools resembled cold oatmeal gruel ; the stomach would retain nothing. In the afternoon the urgent symptoms subsided, and the man gradually recovered.

10. My valued friend, Mr. Naylor, of Batley Carr, has favoured me with the following report of a recent case. In this, as in the preceding, I omit the details of treatment as inapplicable to the present point of discussion. "A female, about 25 years of age, of a slender make, and dark complexion, who had been previously subject to attacks of pain at the stomach, was seized between one and two o'clock in the morning with sickness and pain in the stomach and bowels, purging, succeeded by vomiting. I saw her about nine o'clock. The countenance was pale, respiration feeble, pulse 110 and weak, the legs cold and occasionally affected with cramp, the sickness, vomiting, purging, and pain unabated. The matter last vomited was copious, consisting of a mucous fluid containing flocculent matter of a greenish tinge; the motion was scanty, of a mucous fluid similar to that yielded from the stomach, but the flocculi it contained were yellowish; no faecal smell could be perceived. She had made no water since the commencement of these symptoms, when a quantity of limpid urine had been passed. At two o'clock the symptoms continued unabated, the forehead was cold and damp, the eyes sunk and surrounded by a dark circle, the lips livid, the tongue a little furred, moist and cold, the hands pale and shrunk, the abdomen tender to the touch, and feeling as if it contained firm elastic masses. The least raising of the head from the pillow occasioned sickness and vomiting. The matter vomited was similar in appearance to that previously examined, with the absence of the greenish tinge of the flocculi; and a scanty stool, the only one preserved since the morning visit, was not distinguishable in appearance from the vomitings. The cramp had increased in frequency and force, the pulse was 130, and hardly perceptible at the wrist, the voice was tolerably firm. About six ounces of inky blood were with much difficulty obtained from the arm. It coagulated soon, was a little buffed and tolerably firm.

After the use of active remedies, "a copious vomiting, containing some alimentary matter, succeeded, the pain ceased, the pulse rose to 140, the countenance became coloured, and a calm, accompanied with a few minutes of sleep, succeeded, during which the orifice in the arm poured out a considerable quantity of florid blood. At seven o'clock in the evening I left my patient relieved of all her urgent symptoms. The vomiting occurred twice during the succeeding night, but did not occasion any distress, and she gradually recovered from her state of exhaustion."

The cases which I have adduced are not offered as fair samples of English epidemics. They are rare; while milder forms of the disease are abundant. They show not what English Cholera generally is, but what it can be—the appalling form which it sometimes presents. This aggravated character, we can only, in the present state of our knowledge, ascribe to peculiar and obscure modifications of atmosphere, to predisposition, or circumstance. In what does it differ from the Malignant Cholera, the Spasmodic Cholera of India? I believe in none. I do not, of course, mean to assert that the cases to which I refer, are accordant in every particular either with those in India, or with each other. No two cases can in any country, or of any disease, be expected to have precisely the same symptoms. But I contend that the signs which are considered to characterize the Indian Cholera are found in a marked and decided degree in the cases just stated. Thus we have the peculiar character of the evacuations—the sudden and great prostration of strength—the extraordinary reduction of pulse—the shrunk and purple countenance—the loss of voice—the purple, or pale, contracted state of the extremities—and death sometimes in a few hours. I conceive, therefore, that no fair reasoner can refuse to admit the identity of the disease. A physician sent down by government to ascertain the character of the

Cholera in the north of England has repeatedly declared that he could distinguish the Indian from the English *only* by the *prevalence* of the former—the *number*, not *nature*, of the cases giving the distinctive character of the Indian ! Cholera in England has certainly not produced as great a mortality as Cholera in India. Neither has inflammation of the liver ; yet no one considers Indian Hepatitis as distinct, in nature, from English. The character of the people, their habits and food, climate, and other circumstances, have produced a mortality from both diseases which seems enormous to the English practitioner. Could an Indian army, however, with its train of followers—enfeebled, debauched, and fatigued, deficient in protection from the weather, deficient, especially, in nourishing food—have been encamped in England in 1825, we should have beheld, I conceive, the most appalling form of the disease. The concentration of individual cases in bad circumstances, would have produced a poison as communicable from person to person, and as fatal as the present dreaded epidemic. Had the English and Indian Cholera been attentively compared, medical boards would not have been perplexed in their attempts to declare the symptoms which distinguish the one from the other, nor have considered an absence of bile the peculiar and distinguishing character of the Indian malady. But men, not familiar with the epidemics of former years, have determined the character of the present. The Indian practitioner has been sent to decide between two diseases, when he was intimately acquainted with but one. Had the identity of character in the epidemics been ascertained by the medical men, who have given opposite names to the disease in particular places, official papers would have been more satisfactory and accordant ; the distressing doubt of the public would have been prevented ; and more attention have been paid to the important and practical parts of the subject.

TREATMENT OF CHOLERA.

The treatment of Cholera to be safe and efficient must, of course, be founded on a correct view of the nature of the malady, and have close regard to stage and circumstance. The disease, in its worst form, is marked by reduction of nervous energy and circulation. Stimulants are therefore obviously required: but their employment and degree must have reference to the vitality of the organs, and the state of the blood, which they urge the vessels to circulate. If this fluid be vitiated, if in plain terms it be so thick that the action of the heart and blood-vessels is insufficient for its free transmission, medicines which urge these vessels to do what they cannot, must fruitlessly exhaust their vitality. If, therefore, as we have reason to believe, the remarkably reduced state of the nervous and circulatory systems be intensely connected with a change in the character of the blood, our attention must first be directed to this fluid.

BLEEDING is particularly indicated. It acts, first, by reducing the quantity of the blood. Vessels unable to propel a full, will probably be able to propel a reduced quantity. 2. It alters the quality. In the course of experiments made in 1818-19, I remarked particularly the increase in the proportion of Serum which takes place during haemorrhage.* The blood becomes decidedly

* "The following observations support the general inference that the serum is relatively increased during the continuance of bleeding; and it is surprising how great a change, in this respect, the lapse of a minute produces. About one pound of blood was subtracted in three successive proportions, from the arm of a muscular man, labouring under Angina Pectoris. It was weighed three days afterwards:

	SER.	CRASS.	SER.	CRASS.
1st Cup had	160	360	or as 10 ... to ...	22.5
2nd	420	594	10 ...	14.1
3rd	413	736	10 ...	17.6

" In another experiment the proportions were found to be as

thinner. This change may be referred to the action of the absorbents on the serous cavities. 3. Bleeding reduces spasm. 4. It tends to promote the natural secretions.

This remedy from the time of *Curtis* to the present, has been commended by some and distrusted by others. *Annesley*, who urges it more zealously than any other author, admits that occasionally it has appeared to hasten the fatal event. We were informed that at Sunderland it had been useful to some patients and injurious to others. Decided benefit, however, we have witnessed at Newcastle, as well as in practice at home. Its effects depend, of course, chiefly on the judgment which directs its application. The stage of the disease and the character of the patient must be considered with attention. A naturally feeble frame, great age, or sudden and great debility, without suspension of the pulse, ought not, however, to preclude the remedy. *Whenever, indeed, the pulse can be felt at the wrist, the best results may be anticipated; whenever it is wholly absent, the measure is one of doubt and danger.* The patient must be bled in the recumbent posture, and the quantity drawn should have reference to the state of the patient. In debilitated subjects, it would probably be better to take small quantities at short intervals, than bleed largely at once. Aware, however, that the success of the measure depends on a change in the character of the blood, we must not be satisfied till the fluid becomes lighter-coloured, and inclining to scarlet.* *Mr. Annesley* states, that though the stage of exhaustion generally forbids the lancet, an opportunity

follows:—

	SER.	CRASS.	SER.	CRASS.
No. 1.	260	335 or	as 10 to ...	12.8
2.	500	520	10	10.4
3.	400	526	10	13.1
4.	440	500	10	11.3
5.	450	536	10	11.9"

* *Mr Annesley* says, "When we observe, therefore, the thick, black, carbonated blood, change to a natural red colour, and consequently to a thinner consistence, we may rest satisfied that the disease is under our

nity of taking blood with decided benefit, sometimes presents. It is marked by a struggle of nature to restore the circulation, an effort, which unaided, she cannot effect. The abstraction of blood may here save. To determine, however, on the precise juncture for this measure requires "both tact, and judgment. It is, perhaps, the most difficult point in the treatment of the disease."

Bleeding by leeches, or cupping, is calculated rather for local determination occurring during Cholera, or for the inflammation of the stomach or bowels, which sometimes succeeds, than for the disease itself.

Viewing the alarming symptoms of the patient, as dependant chiefly on the depraved state of the blood,—TRANSFUSION is suggested. It has long been known that blood may be removed, without injury, from the vessels of one animal to those of another, if it be done with caution, and between animals of the same species. The experiment has been performed with safety and effect on man. A few years ago, Dr. Blundell introduced a syringe, which facilitates the operation, and diminishes the chance of air's been ad- controul. I saw a very striking instance of this fact, in the case of a young lady at Madras, who was attacked with Cholera. The symptoms were decidedly marked, and the usual remedies were applied. The pulse was fluttering, and seemed oppressed. I ordered a vein to be opened, and gave particular directions to the gentleman in attendance with me, and in whose observation and judgment I had the fullest confidence, (Dr. Archer) to let the blood flow till its colour changed from black to red, without reference to quantity. At first it came away only in drops, and was exceedingly thick and black. Warm flannels were applied to the arm, and in a few minutes the blood began to flow more freely, but still in a very languid stream. After three or four ounces had been taken, the colour changed, and it flowed with perfect freedom, the pulse got up, became more regular, and soft, and although not more than eight ounces were taken, the patient recovered rapidly."

Dr. Lefevre, from his experience at St. Petersburgh, remarks, "Bleeding from the arm in the first stage, when the pulse is full and the temperature not reduced, is often sufficient to cut short the disease. The quantity of blood to be drawn should be but small ; eight ounces will be sufficient to allow the remainder to circulate more freely, and relieve the heart, and this will not too much exhaust the patient."

mitted with the blood. The remedy has been used in Cholera, but, I believe, without success ; whether in a fair manner, however, and with requisite caution, I have not the means of ascertaining. The difficulty of applying the remedy, will, I fear prevent its general use. Some years ago I attempted it on a man sinking from Cholera, but the relative, who had promised his blood, fainted on the opening of the vein.

Adverting again to the thick state of the blood, the **INJECTION OF A MILD, DILUENT FLUID INTO THE CIRCULATION**, suggests itself as a highly promising remedy. Magendie some years ago recommended it for Hydrophobia, but I am not aware that his statements have led to its fair trial in this, or any other disease. No great difficulty can be expected in the application of the remedy. In the purple, or asphyxiated stage of Cholera, when blood cannot be freely obtained, an ounce or two of warm distilled water may be slowly injected up a brachial vein ; and the doses repeated at intervals. Care of course should be taken that as little air as possible gain admittance. How far a solution of soda and other salts in which the blood is deficient, would be preferable to the simple injection, is an important question.

CLYSTERS have been too often considered as an inefficient or minor remedy in Cholera, as well as in other diseases. In the case stated by Mr. Naylor, (page 38,) great benefit resulted from them ; and numerous remarks of the Anglo-Indian medical men might be adduced in their favour. In many of the severest cases of Cholera, I have employed them ; and always with advantage, when retained. Whence the benefit ? From the evacuation of the large bowels ? The effect is sometimes most marked when there is nothing to evacuate. From the articles added to the simple clyster ? I conceive not. Laudanum is almost the only energetic ingredient, and this when taken by the mouth, and when

consequently it is applied to a large portion of the nervous system, often fails to produce the same benefit which the enema effects. Were the powers of the laudanum even greater on the large intestines than on the stomach, it appears by no means calculated to remove either the loaded state of the small intestines, the depravation of the blood, or the defect of secretion. May not the benefit of clysters result from their simple ingredient—the absorption of the water, and the consequent dilution of the blood? A remedy so easy of application, so devoid of danger and inconvenience, ought to be more systematically employed, and its effects more fully observed.

OPIUM is often of marked utility, but often also it has appeared injurious by the stupor it has induced. Here, as in other cases, the effect depends on the stage and mode of exhibition. On the approach of the disease a full dose produces generally the best effects. It allays irritation, prevents the cramp, and induces a state of repose from which the patient awakes well or convalescent. The stage on the contrary of suppressed secretion and obstructed circulation, it is evidently calculated to injure. A pill or bolus is the best form of administration, and the watery extract I conceive superior to the crude drug. Two or grains of the extract may be given for a dose.

CALOMEL is a remedy which has been universally employed in a small or a large dose, in combination or alone. In the milder cases of Cholera it is usually given in the quantity of one to three grains with opium. A pill, which I have long employed, is two grains of calomel and half a grain of the watery extract of opium. One or two of these are given on the occurrence of purging or pain, generally with prompt relief, but repeated in an hour if the effect be not decided. Scruple doses of calomel, proposed originally by *Dr. James Johnson* for the Indian disease, I have long been in the habit of occasionally employing. No irrita-

tion in the bowels is ever produced by this dose. Five grains of calomel will often cause great griping and distress ; 20 or 30 never. In this dose it acts as a mild cholagogue purgative. *Annesley* maintains, partly from experiments on the peculiar substance found in the intestines after death, partly from observations during life, that calomel acts specifically in combining with this noxious substance, and promoting its removal. Mercurial preparations, it must be observed, are not calculated for the stage of collapse. It is not till the circulation is reviving, that we must think of cleansing the duodenum and the liver. We may give indeed at the outset a dose of Calomel, but its action must not be expected, while the circulation is extremely reduced. Mercury in alterative doses is sometimes required after the urgent symptoms of the disease are reduced. At Newcastle and its neighbourhood, this practice is at present generally pursued. In India Mercury has been considered necessary also during convalescence ; but in this country I conceive there is seldom any need of cholagogues, and when there is a fault in the biliary secretion, more suitable articles may be found, as Veratrum, Taraxacum—and Chlorine externally applied.

AMMONIA is a particularly valuable remedy, the best of the diffusible stimulants. I am surprised to find, on examining the works and reports on the Cholera of India, that this article is so rarely and slightly noticed. Several cases in this country as severe as those of India, we have saved in the last stage, chiefly by the exhibition of this remedy. But it was administered in fuller doses, and much more frequently than in ordinary disorders. Every quarter or half hour, as much has been given of the aromatic spirit of ammonia as the stomach would bear ; one ounce for instance, in the course of three or four hours ; circulation has scarcely then revived, but the continuance of the remedy with brandy, pepper, and minor means, has at length saved the patient.

BRANDY is an excellent auxiliary. Diluted with an equal quantity of water, it may be given in the quantity of a table spoonful every half hour or hour alternately with the ammonia. This alternation I conceive to counteract the ill effects, to which the remedies singly would be liable. If ammonia alone were given, the stomach might at length be nauseated; if brandy alone, and largely, a stupor might be induced of baneful tendency.

ÆTHER, CAMPHOR, OIL of PEPPERMINT, and MUSK, have been often employed, but with no very marked effect. The peppers are sometimes used with advantage.

MUSTARD FLOUR, the unadulterated powder of the seeds, has been given at Newcastle and Gateshead, as an internal stimulant, ten to twenty grains every few hours, and I am informed with considerable benefit. PHOSPHORUS has been used on the Continent, but not, I believe, with decided advantage. In some desperate cases of typhus, I have known it raise the sinking pulse in a remarkable degree. Administered with care, it does not appear to be a severe or dangerous remedy. HYDROCHLORURET of LIME, from *Dr. Reid's* testimony to its value in typhus, and in the advanced stage of dysentery, is likely to be available in the exhaustion of Cholera. The dose is one or two grains in syrup.

In the administration of stimulants, much depends on the mode and frequency of use. No relative, no nurse, is to be trusted. A medical person, pupil or principal, is required to regulate the dose by the effect on the pulse and the stomach, and to persevere when nurses have tired and relatives despair.* In giving stimulants, however, we must remember that inflammation of the villous coat of the stomach often supervenes on Cholera, , and sometimes rather

* A man, for instance, in the stage of exhaustion, and whose case most persons would have considered utterly hopeless, was saved by the zeal and attention of *Dr. Whytehead*, then my pupil, who never left the patient for twelve hours, himself administering stimulants every quarter or half hour during this period.

suddenly on a stage of collapse. We must, therefore, watch carefully the effects of our medicines.†

The INHALATION OF OXYGEN has been recommended, but never, I believe, fully and extensively tried. In one or two cases at Sunderland, it produced marked benefit. Nitrous Oxide appears preferable. Though oxygen will perhaps have a more decided chemical, Nitrous Oxide has, I conceive, a more marked vital agency. Some years ago I tried its effects in various disorders, but particularly in congestive headache. It gave, in most cases, immediate relief. One great inconvenience, however, from its use is the hysterical affection, it induces in females. Whatever gas be employed, it is apparent that no great and permanent good can arise in Cholera, unless the nervous system of the lungs be in a state to decarbonize the blood. A merely chemical agent cannot avail. How far the inhalation of oxygen, or nitrous oxide may excite the nervous system of the lungs is not known; but if the pulmonary cells and airtube be gorged with albuminous exhalation, as rendered probable by the observations of *Dr. Christie*, the air inhaled cannot have free access either to the blood or the nervous tissue of the lungs. The subject, however, demands further and closer observation.

GALVANISM, from its well known agency on the nervous system, has been suggested for Cholera. It well merits trial, particularly in the stage of impeded circulation. The wires from a 50-plate trough may be applied, one to the base of the skull or to the nape of the neck, and the other to the pit of the stomach, the skin having been previously wetted with dilute muriatic acid.

Mr. Boyle observing the marked relief which always succeeds on the evacuation of bile, and reflecting that nothing produces it more quickly than vomiting, considered this dis-

† I was surprised to hear that M. Magendie, while at Sunderland, proposed to *induce* gastritis for the cure of Cholera.

order an effort of nature for her relief, and determined to promote it by emetics. He therefore gave TARTARIZED ANTIMONY in small, then in larger doses, and sometimes as much as five grains, succeeded by a scruple of Ipecacuanha, till full vomiting was induced. The effect, he states, to have been decidedly beneficial.

At Newcastle, of late, MUSTARD has been extensively employed as an emetic, and the reports are decidedly in its favour. It is probable that both Antimony and Mustard have effects ulterior to their agencies as emetics. Mustard probably, Antimony certainly, in doses too small to disturb the stomach, acts on the liver. A solution of Tartarized Antimony—a third of a grain every two or three hours—is sometimes given in ordinary Cholera. Vomiting often succeeds the first draught; but, whether spontaneous or produced by the medicine it rarely continues, and after the first or second, the subsequent doses produce no annoyance. The practice I have observed to be safe and beneficial.

COMMON SALT was given by Mr. Searle at Warsaw,—a large table spoonful in a wine glass of warm water, repeated till vomiting was produced; and subsequently smaller doses to affect the bowels. If by such practice absorption of Soda take place, so as to restore in any degree the saline constituents of the blood, we see a prospect of advantage.

When vomiting is the most urgent symptom, LEMON JUICE we have long used with marked advantage; a table spoonful, for instance, slightly diluted, every half hour till the stomach be settled. *Mr. Annesley* recommends Tar-taric Acid for detaching the morbid matter of the intestines. Fresh Lemon Juice would be more grateful to the stomach, and no doubt equally efficacious.

PURGATIVES are often required. *Mr. Scott* and *Dr. Christie* both refer to the distended state of the intestines in the patients, whose alvine evacuations had not been great, and consider the bowels in these cases to have been unable to

expel their contents. When, therefore, the circulation is reviving, and a grey or greenish evacuation is procured, a scruple of calomel, with a few grains of jalap, will greatly assist in the removal of the foul contents of the intestines, and promote the further secretion of the liver.

MAGNESIA, by allaying the irritation in the stomach, and gently acting on the bowels, is an useful medicine, but calculated rather for the effects, than the presence of Cholera.

BISMUTH was extensively used in Russia and other parts of the Continent--too much extolled at first, and then suddenly abandoned. In various disorders of the stomach, English practitioners commonly employ it, and in the vomiting of severe Cholera, I have seen it produce excellent effects. Added to other remedies, it will frequently keep on the stomach what would else have been rejected.

We must next notice external applications. The chief are BLISTERS, BOILING WATER, NITRIC ACID, and SINAPISMS. A PLASTER OF CANTHARIDES will not produce an effect on the skin, in the purple form of Cholera. Boiling Water has been frequently employed in India to produce vesication, and generally with success. Nitric Acid applied with a feather over the region of the stomach, is a very powerful means of relieving cramp in that organ. Applied also over a portion of the scalp, I have found it rouse the nervous system in apoplexy. In extreme oppression, therefore, of the circulatory and the nervous systems it may be applied to the nape of the neck with a prospect of advantage. For less urgent cases, however, we should prefer the milder application of Sinapisms to the spine or to the pit of the stomach. Speedy but not violent in their operation, producing great, but not sudden excitement, they are generally preferable to agents which might shock or exhaust the nervous energy.

Moxa also may be suggested, in the modified degree,

which we often employ in the practice of surgery. A roll might be burnt by inflation over the cervical and dorsal spine, at such a distance as the patient can bear without annoyance : or if an effect be not soon produced, the French mode of burning Moxa on the part might be tried.

The actual Cautery has been used on the continent, and I believe in one or two cases in England, but has not yet received an extensive trial. FUSED POTASS rubbed on each side of the cervical spine would probably be equally efficacious, and far less objectionable to English feelings. In cases of other diseases for which this remedy has been employed, I have often remarked its speedy and beneficial impression on the nervous system. So fatal a form of the disease as the purple Cholera—a form which at Sunderland and Newcastle appears to have destroyed, either directly or by the consecutive fever, *every* individual attacked—surely demands our trying all means for its relief.

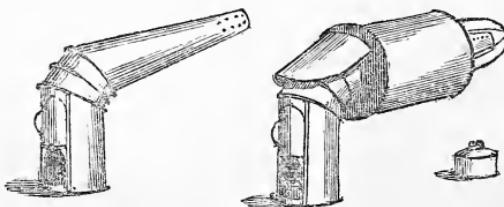
ARTIFICIAL HEAT is obviously required ; and various have been the means used for applying it. Hot blankets, bricks and stones ; bottles and tin-vessels filled with hot water ; bags of heated sand, grain, or bran ; vapour and the warm water bath, have all been employed. The last is now generally disapproved of, on account of the inconvenience and danger of moving the patient ; and some of the other, have been urged to the distress, rather than the relief of the patient. It should be remembered that coldness is an effect, not a cause ; and that if by artificial means we could raise the temperature of the body to 98 degrees, we should effect little improvement. A moderate degree of heat will tend to excite the nervous system, and through it the organs of circulation and secretion ; but a higher degree, a degree which is unpleasant to the patient's feelings, tends fruitlessly to exhaust the nervous energy. The subject, indeed, of purple Cholera, like a person frost-bitten, is distressed and injured by the heat agreeable to his attendants.

Accustomed for several years past to witness admirable

effects from the SPIRIT-AIR-BATH in various disorders, but especially in diarrhoea and dysentery, I suggested it some months ago in the treatment of Cholera. In two cases which have since occurred, my medical friends found it of great utility, and in three others of marked character I have myself used it. One was a female at Newcastle, in the last stage of the worst form of Cholera, and who was decidedly benefited for a time, but who sunk two days after we left the town: another, the case mentioned at p. 37, and who recovered; the third, an infant, a less urgent, but still a decided case of the third form, and who also recovered. The Spirit-Air-Bath relieves internal congestion by determining blood to the skin, and producing free perspiration. It has, moreover, a remarkable anodyne power, which allays the irritation of muscle and nerve.* This remedy was used, we learnt, in a few cases at Sunderland, but with no good effect. There is often a mode of trying a remedy, which determines its efficacy or failure. The bath was said to leave the body colder than before its application. But for what time was it used? I suspect for a short time. If so, we cannot wonder at its failure, and at the body's being colder than before its application. To try it fairly, the bath must be kept up for *several hours*, even a day, in fact until warm and universal perspiration be established.† In

* I know not whether the combustion of Alcohol is an *open* vessel or tube, resolves all the spirit into water and carbonic acid, or whether some spirit rises with the aqueous vapour. The effect on the animal economy appears to me considerably to differ from that of mere heat. Hence I have applied the name of *spirit-air* rather than *hot-air-bath*.

† The apparatus I employ is efficacious and of easy application.



The first of these figures represents the simple tube, which with the lamp is the only *essential*. The second is the tube passed through an envelope.

the stage of invasion the Spirit-Air-Bath will rarely fail, I believe to produce great and speedy benefit. In the purple form, when the blood is thickened, as well as in the stage of exhaustion, though I have seen it useful, I doubt its general applicability. The profuse sweating induced would probably abstract too much the serum of the blood. In these stages, probably dry heated air is preferable. Mr. Kennedy recommends *moist* heat for the early stages, *dry* for the stage of exhaustion.

FRICITION is highly important, much more important than the application of *mere* heat; and the hand is probably as good as any mode of applying it. When the spasms are urgent, oil of turpentine freely rubbed on the parts is very useful.

In reference to the patient's DRINK, it may remarked, that the quantity should be small, and that the best article on the whole is lemon-juice, diluted with an equal quantity of water. Most writers on the disease strongly object to the imbibition of any thing cold. The patient implores for cold drink, but can only receive it by the breach of medical order. Why

lope, which has projections at the ends, to preserve the bed-clothes from being scorched. Both parts of the apparatus may be made of thin sheet-iron or of tin. For the tube I prefer the former metal; but if tin be used, the joints must be plated, not soldered. The upright limb of the tube should be about a foot in length; the horizontal 18 or 20 inches. The lamp should have two holes for wicks. It may be filled with whisky or brandy, if spirit of wine be not at hand. In using the Bath, we employ *no cradle to support the bed clothes*. A short stick or common kitchen rolling pin, erected between the bedclothes, is sufficient for the admission of air to the person, and even that is not essential. The sheets being drawn aside, the upper end of the apparatus is introduced between the blankets, and the lower part placed on a chair by the bedside. The spirit-lamp is then lit, and placed in the tube. The degree of heat, or rather the quantity of heated air, is promptly regulated by raising or depressing the slide attached to the lower aperture. The diminution of the opening, by *lowering* the slide, reduces the supply of heated air, and vice versa. Patients in the severer forms of Cholera do not generally bear the full heat of the Bath.

this prohibition? The answer I suppose would be, that cold drinks must necessarily chill the stomach, and through it, the body at large. But reflection would urge that the reduced temperature of the stomach ought not to be inferred from that state of the surface—that this organ in fact suffers from a sensation of heat; that the coldness of the body at large is an effect, not a cause of the disease, and in a word that no proof can be adduced of injury from cold drinks in this disease.

When drink is rejected by the stomach, and craved for by the patient, it is well to remember that the sensation of thirst may be allayed by merely washing the mouth and throat.

The recumbent posture must be strictly maintained. Rising from bed has produced a fatal syncope. Patients have sometimes a false feeling of strength, even when the pulse is imperceptible at the wrist, and the body covered with a clammy sweat. The visit of friends should be prevented, or their conversation controuled.

I have thus referred to a number of remedies, for selection, or use in particular circumstances. We must not, however, trifle with minor means. The season of action is short. Let us briefly recapitulate the principal remedies, with reference to the stages of the disease.

1. *For the stage of invasion*, Calomel in one full dose, conjoined perhaps with Opium—Spirit-Air-Bath—Ammonia and Brandy—Friction—Artificial Heat—Bleeding.

2. *For the stage of deranged secretions and obstructed circulation*, Bleeding—Calomel—Ammonia—Counter-irritation by Sinapisms, &c.—Moxa, or Potass—Clysters—Injection of water into the blood vessels—Galvanism—Friction—Artificial heat—Spirit-Air-Bath.

3. *For the stage of Exhaustion*, Ammonia and other stimulants—Transfusion of blood?—Dry heat?

4. *For reaction advancing to Inflammation, and for local congestion*, Leeches or Cupping—Clysters—Si-

napisms, &c.—The application of Nitric Acid undiluted, or of Blisters.

A person, then, attacked with the urgent symptoms of Cholera should be immediately put to bed, have bottles of hot water, heated bricks, or bags of hot sand, applied to the extremities, and the Spirit-Air-Bath introduced. If the pulse be perceptible at the wrist, eight, ten, or twelve ounces of blood should be drawn from the arm; forty or sixty drops of the aromatic spirit of Ammonia, or ten or fifteen of the pure solution, should be given in a small quantity of water every quarter of an hour. A scruple-dose of Calomel may be administered. Warm water in small and repeated quantities ought to be injected into the rectum. The limbs should be constantly rubbed. The remedies must be used, however, with as little disturbance as possible to the patient, and care be taken that one means does not interfere with another. In many cases, decided marks of improvement will soon be apparent; the countenance will brighten, the pulse rise, and the surface become warmer. Stimulants should then be more cautiously used. If the stomach be irritable, lemon-juice diluted with an equal quantity of water should be given, and a blister, or sinapism, or onion-juice, may be applied to the epigastric region. When the stomach is sufficiently settled, a purge of calomel and jalap, or a dose of castor oil should be given; and the action of the bowels solicited by clysters. Jalap with Bismuth may afterwards be employed. We must vigilantly expect local inflammation. If the reaction advance too far, if the patient complain of pain in the abdomen, and if there be tenderness on pressure, a large number of leeches must be promptly applied, and clysters frequently given. Blisters of course are also important. Magnesia may here be administered with advantage. If the head be affected either with pain or stupor, cupping

glasses should be applied to the nape of the neck, or leeches to the base of the skull.

I have thus adverted to the measures required when the patient rapidly rises from the stage of oppression. We must now suppose that he does not rise from that stage; that little or no blood can be obtained; that no pulse is perceptible. In this case we ought, I think, to try the injection of warm water into a vein, and the respiration of nitrous oxide gas. A roll of Moxa may be burnt, or nitric acid, or fused potass, may be applied near the cervical spine, and sinapisms be laid on the abdomen. Possibly galvanism applied to the chest might excite the action of the heart. Friction must be continued.

If the patient finally lapse into a state of extreme exhaustion, we must not still despair. The hydrochloruret of lime may be tried. Stimulants, at least, particularly Ammonia, must still be given, and given frequently, along with nutritious fluids;—for instance, every five minutes, alternately a dose of ammonia, a spoonful of arrow-root gruel and brandy, or one of strong beef tea. Mustard cataplasms must be laid on the arms and legs, and dry heat constantly applied. By these means, the worst cases, referred to in a preceding part of the tract, were saved. I am convinced that stimulants, when administered fully and perseveringly by a medical man, are capable of saving a great portion of those who fall in the last stage of Cholera. Apathy, fear, and despair, are as great evils in the practitioner, as a sinking circulation in the patient.

PREVENTION OF CHOLERA.

To the question so frequently asked, “What shall I do to preserve myself from an attack of this awful disease?” we reply,—1st. Attend to your general health. If the digestive organs be out of order, take medicines,—not a dose of salts,

no violent cathartic, not a quack composition, not a domestic nostrum ; but refer to your medical attendant, who will adapt his remedy to the *actual* disorder. I would suggest to the professional reader the inhalation of chlorine, as a valuable means of improving the general health. This gas is well known to act on the bronchial membrane, but I allude to another effect : it has a marked agency on the digestive organs. Under its use I have often seen the tongue become clean, the appetite improve, the strength increase. The lotion, or bath of chlorine, is also very advisable, when there is any defect or depravation of the biliary secretions.

2. Attend to diet. Live well, but live temperately. Take nourishing food, but in less quantity than usual. Eat few vegetables, and those fully cooked. Drink wine after dinner, and, if faintly in a forenoon, take then also half a glass and a biscuit. Reduce, however, the liquid quantity of food, and particularly tea and coffee. The digestive organs are often vastly improved, by restricting the drink to the sum-total of a pint, or eighteen ounces, in the twenty-four hours.

3. Let the clothing be sufficient to keep warm the whole surface, but particularly the feet. A flannel belt round the body is also recommended.

4. Sponge or wash, and then briskly rub the body all over every morning. Cleanliness of person, as well as of dwelling, is of the greatest importance.

5. Take regular exercise,—a walk brisk enough to produce moderate perspiration ; or, if the feet be not subject to cold, take daily an hour or two's smart ride on horseback ; but avoid fatigue and long exposure to wet and cold.

6. Above all, attend promptly to the invasion of disease,* even slight and

* Mr. Annesley says, “ In the cases where recovery took place, the disease was met at an early period ; and in those which terminated fatally, four, five, and six hours had elapsed from the first attack, before medical assistance was had recourse to. From this fact it appears evident, that if the disorder be taken at its commencement, or within an hour after the

familiar. Nine-tenths of the worst cases of Cholera are preceded, for a few days, by disorder, which I sincerely believe would never have been succeeded by fatal disease, had it been early regarded.

General uneasiness, slight irritation in the bowels, and sickness are not at common periods alarming ; but if Cholera be apprehended they should be promptly met by medical treatment. *Depression of spirits, countenance shrunk* and dejected, a cold clammy state of the skin, oppressed circulation of blood, indicated by prickling sensation* in the hands, and a labouring pulse, are equally important. *Watery purging, succeeded by vomiting of pale fluid and sudden depression,* are more threatening symptoms ; and prove, indeed, the actual invasion of the disease. An increased discharge of urine, has occasionally preceded for some days, the attack of urgent Cholera. But of all the premonitory symptoms, *diarrhoea, a relaxed state of the bowels, rather than severe purging, most frequently intro-*

seizure, it is as manageable as any other acute disease ; but the rapidity with which it runs through its course requires the most active exertions before it can be checked, and the loss of an hour may cause the loss of life !”

Mr. Orton has a similar observation. “ I am likewise convinced, that much mischief has arisen from a disposition to doubt the existence of disease in patients who present themselves, until the whole train of its formidable symptoms are developed, and consequently until it has gained so much ground as to be combated at a great disadvantage. The first symptoms, are, however, sufficiently well marked, and little less certainly indicative of the disease than those which follow. We know too, that all diseases tend to put on the form of an epidemic, which is prevailing generally at the time of its occurrence ; and we should seldom err in applying the treatment of this epidemic to many of the numerous slight affections of various kinds which occur at the same time, and, however different at first, are often seen quickly to assume the form of Cholera. At least the mal-practice which might thus arise bears no comparison to that of the opposite system.”

* A dark crescent under the eyes, and a shrunken aspect of countenance, are mentioned by Dr. A. Smith, as existing in some cases for days previous to the invasion of the disease.

duces the spasmodic or purple Cholera. On referring to notes of the worst cases I have seen, the cases in which life has suddenly sunk, I find this state to have preceded for some days the fatal seizure. I suspect, that in the most shocking cases which India has produced, that for instance, of the tailor at Bellary, who was struck dead with his work in his hands, it would have been found, had opportunity offered, that diarrhoea had preceded. I was favoured last week with a report of the state of the Cholera at Gateshead, by Mr. Brady, an intelligent surgeon, and who has had under his care fully one-third of all the cases attacked. He remarks, “on careful investigation, I am fully convinced that a diarrhoea of two or three days’ standing is almost an invariable precursor of the disease; and that, if this be promptly checked, many deaths will be prevented.”

I have thus noticed four or five states of disorder, with one of which, and generally the last, Cholera begins. These states are decidedly under medical controul. A full dose of extract of opium in one—bleeding in another—bed, and Spirit-Air-Bath and cordials, as ammonia, aether, or brandy, in all—will give speedy relief; and if attention be also paid to the secretions, especially that of the liver, a speedy recovery is the general result. In no circumstance of life is the common adage of the “danger of delay” more strikingly applicable than here.

It may be said “you are an alarmist, you will frighten people into Cholera. Courage is the great preservative.” I agree with you, that courage *is* a great preservative; but there are two kinds of courage, one which is animal, and consists in insensibility to danger; the other, intellectual, founded on knowledge and preparation. The actual presence of danger converts the blustering heat of the ignorant and self-conceited into panic, it raises the resolution of the prepared and thoughtful, and elicits his resources. If insensibility to danger were the grand preser-

vative, three-fourths of the deaths at Sunderland and Newcastle, would not have occurred. The stupid and reckless have been as frequently destroyed, as the timid and faint. A knowledge of danger does not increase that danger, I would rather say it diminishes that danger. Informed of the nature of the invasion we expect, acquainted with what is proper, and what is improper, and using means of precaution, we shall feel prepared and encouraged. A reliance, moreover, on the protection and providence of God, enables us to meet with resolution the evils of life, and often saves us from the worst.

THE END.

